

REMARKS

Reconsideration of the above-identified application in view of the present amendment is respectfully requested. By the present amendment, the previous claims are cancelled and new claims 43-77 are added.

These new claims are patentable over the previously cited references (Lai in view of either Brice or Nakano). In short summary none of the references disclose providing a layer that is located between first and second layers, for providing a hardening effect to the first to inhibit the migration from the first layer.

Lai acknowledges the problem of electromigration due to mechanical stress (see col. 4, lines 30-31). However, the Lai patent discloses that the layer (22) that has a propensity to migrate is actually itself made in such a way that REDUCES its propensity to migrate. Thus, the layer 22 containing Al and Ti can be considered a non-migrating layer. The Lai patent does not teach to use another (barrier) layer for providing a hardening effect. As such, the Lai patent teaches a completely different approach to the problem than the present invention.

Turning to the teaching provided by the Brice and Nakano patents, it is to be appreciated that an aluminum layer of the disclosed device has oxidation. However, neither patent discloses that the oxidized layer is to be used as an intermediate layer, between two layers (one being a migration emitter and the other being a migration receptor).

It will be clear that even if one were to even try to modify the device of the Lai patent using teachings from Brice and Nakano patents the present invention would not be provided. First it should be recalled that the claims include three layers. This

was clarified some time ago (e.g., during telephone discussion with the Examiner), and thus is easily appreciated. With the presence of three layers, it would seem logical that the person of ordinary skill in the art would be looking at the embodiment of Fig. 3 of the Lai patent because that embodiment has three layers. If the person of ordinary skill in the art would try to modify the Lau Fig. 3 embodiment in view of teachings from Brice or Nakano, then two logical results could occur.

The first logical possibility is that an Al-Oxide layer is added on top of the existing stack (i.e., on top of the titanium layer 24), then the Al-Oxide layer would be on top of another barrier layer (i.e., the titanium layer 24). However, it is to be appreciated that the claim language is presented in terms of migrating metal / barrier / immigration layer. With the Al-Oxide layer on top of the existing stack, the pattern would be non-migrating metal alloy / barrier / barrier, and thus the claim limitations would not be met. As the other logical possibility, an Al-Oxide layer is inserted between the layer 22 (Ti-Al alloy) and the layer 24 (Titanium) of the Lau Fig. 3 embodiment. However, such a modification would result in the same pattern (non-migrating metal alloy / barrier / barrier) and the claim limitations would again not be met.

Even if the person of ordinary skill in the art were to look at the embodiment of Fig. 2 of the Lau patent, the addition of the Al-Oxide layer would merely result in a pattern of non-migrating metal alloy / barrier, and not migrating metal / barrier / immigration layer. However, such a possibility does not seem logical because as mentioned above, the Lau patent already addresses the problem with the non-migrating metal layer.

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Therefore, the person of ordinary skill in the art would not have been led to make the asserted combination, and even if the person some use the teachings, the present invention would not be provided.

If there are any additional fees resulting from this communication, please charge same to our Deposit Account No. 16-0820, our Order No. 33923.

Respectfully submitted,

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